



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : H04N 1/32, 1/00		A3	(11) International Publication Number: WO 96/36163
			(43) International Publication Date: 14 November 1996 (14.11.96)
(21) International Application Number: PCT/US96/06618 (22) International Filing Date: 7 May 1996 (07.05.96) (30) Priority Data: 08/436,102 8 May 1995 (08.05.95) US 08/508,083 27 July 1995 (27.07.95) US 08/512,993 9 August 1995 (09.08.95) US 08/534,005 25 September 1995 (25.09.95) US 08/635,531 25 April 1996 (25.04.96) US (60) Parent Applications or Grants (63) Related by Continuation US 08/534,005 (CIP) Filed on 25 September 1995 (25.09.95) US 08/637,531 (CIP) Filed on 25 April 1996 (25.04.96) (71) Applicant (for all designated States except US): DIGIMARC CORPORATION [US/US]; Suite 213, 10250 S.W. Greenburg Road, Portland, OR 97223 (US).		(72) Inventor; and (75) Inventor/Applicant (for US only): RHOADS, Geoffrey, B. [US/US]; 304 S.W. Tualatin Loop, West Linn, OR 97068 (US). (74) Agent: CONWELL, William, Y.; Klarquist, Sparkman, Campbell, Leigh & Winston, One World Trade Center, Suite 1600, 121 S.W. Salmon Street, Portland, OR 97204 (US). (81) Designated States: AU, CA, FI, JP, US, European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments. (88) Date of publication of the international search report: 16 January 1997 (16.01.97)	

(54) Title: STEGANOGRAPHY SYSTEMS

UV PLANE, 1000

EMBEDDED SIGNAL POWER SPECTRUM, 1002

TYPICAL POWER SPECTRUM OF ARBITRARY IMAGE, 1004

NON-HARMONIC SPATIAL FREQUENCIES ALONG THE 45 DEGREE AXES, GIVING RISE TO A WEAVE-LIKE CROSS-HATCHING PATTERN IN THE SPATIAL DOMAIN

(57) Abstract

Various improvements to steganographic systems, and applications therefore, are disclosed. The improvements include facilitating scale and rotation registration for steganographic decoding by use of rotationally symmetric steganographically embedded patterns and subliminal digital graticules; improved techniques for decoding without access to unencoded originals; improving robustness of steganographic coding in motion pictures and/or in the presence of lossy compression/decompression; and representing data by patterned bit cells whose energy in the spatial domain facilitates decoding registration. Applications include enhanced-security financial transactions, counterfeit resistant identification cards, fraud deterrent systems for cellular telephony, covert modem channels in video transmission, photo duplication kiosks with automatic copyright detection, and hotlinked image objects (e.g. with embedded URLs) for use on the internet.

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 96/06618

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 H04N1/32 H04N1/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 H04N G03G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP,A,0 581 317 (INTERACTIVE HOME SYSTEMS) 2 February 1994 cited in the application see the whole document ---	1,17
A	EP,A,0 551 016 (CANON KK) 14 July 1993 see column 4, line 44 - column 11, line 38 ---	1,17
A	PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON IMAGE PROCESSING (IC, AUSTIN, NOV. 13 - 16, 1994, vol. 2 OF 3, 13 November 1994, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, pages 86-90, XP000522615 SCHYNDEL VAN R G ET AL: "A DIGITAL WATERMARK" see the whole document ---	1,17,32
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

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- *O* document referring to an oral disclosure, use, exhibition or other means
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- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *&* document member of the same patent family

Date of the actual completion of the international search

21 November 1996

Date of mailing of the international search report

05.12.96

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 96/06618

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	RESEARCH DISCLOSURE, no. 358, 1 February 1994, page 75 XP000439803 "AUTHENTICATION AND DISPLAY OF SIGNATURES ON ELECTRONIC DOCUMENTS" see the whole document ---	22
X	EP,A,0 649 074 (XEROX CORP) 19 April 1995	32
Y	see column 5, line 40 - column 13, line 5 ---	33
Y	EP,A,0 605 208 (CANON KK) 6 July 1994 see abstract see page 8, line 12 - line 14 ---	33
A	US,A,3 809 806 (WALKER R ET AL) 7 May 1974 see column 1, line 11 - line 25 -----	32

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 96/06618

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. Claims 1-31: Method of embedding auxiliary data in and recovering them from image data using encoded calibration data
 2. Claims 32,33: Photo-duplication kiosk for detecting copyright data and for interrupting printing
1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
 2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
 3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
 4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 96/06618

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
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		JP-A-	6343128	13-12-94

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		US-A-	5457540	10-10-95

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		JP-A-	7175867	14-07-95
		US-A-	5444779	22-08-95

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		JP-A-	7046400	14-02-95
		CA-A-	2112735	02-07-94

US-A-3809806	07-05-74	NONE		
